ARI Research Note 88-103

Target Acquisition and Analysis Training System (TAATS): Retention and Effects of Retraining

Otto H. Heuckeroth, Norman D. Smith and
Gary L. Shope
Army Research Institute

ARI Field Unit at Fort Hood, Texas
George W. Gividen, Chief

Systems Research Laboratory
Robin L. Keesee, Director

December 1988

United States Army
Research Institute for the Behavioral and Social Sciences

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

JON W. BLADES
COL, IN
Commanding

Technical review by

William Brown
Jay S. Coke

NOTICES

DISTRIBUTION: This report has been cleared for release to the Defense Technical Information Center (DTIC) to comply with regulatory requirements. It has been given no primary distribution other than to DTIC and will be available only through DTIC or the National Technical Informational Service (NTIS).

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research institute for the Behavioral and Social Sciences.

NOTE: The views, opinions, and findings in this report are those of the author(s) and should not to be construed as an official Department of the Army position, policy, or decision, unless so designated by other authorized documents.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS --
2a. SECURITY CLASSIFICATION AUTHORITY --	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE --	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Research Note 88-103	5. MONITORING ORGANIZATION REPORT NUMBER(S) --
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Research Institute	6b. OFFICE SYMBOL (If applicable) PERI-SH
6c. ADDRESS (City, State, and ZIP Code) HQ TEXCOM Fort Hood, TX 76544-5065	7a. NAME OF MONITORING ORGANIZATION -- 7b. ADDRESS (City, State, and ZIP Code) --
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U.S. Army Research Institute	8b. OFFICE SYMBOL (If applicable) PERI-SZ
8c. ADDRESS (City, State, and ZIP Code) 5001 Eisenhower Avenue Alexandria, VA 22333-5600	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER

10. SOURCE OF FUNDING NUMBERS			
PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.
63743	A795	3.2.1	5730

11. TITLE (Include Security Classification)

Target Acquisition and Analysis Training System (TAATS): Retention and Effects of Retraining

12. PERSONAL AUTHOR(S)

Heuckeroth, Otto H., Smith, Norman D., and Shope, Gary L.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM 7/82 TO 7/83	1988, December	38

16. SUPPLEMENTARY NOTATION

--

17. COSATI CODES		
FIELD	GROUP	SUB-GROUP

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

Vehicle identification
Combat Vehicle Identification (CVI)
Target acquisition
Retention
Recognition
(Continued)

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Within the context of the Target Acquisition and Analysis Training System (TAATS), the Basic Combat Vehicle Identification (CVI) program was used to explore decay in recognition and identification (R&I) performance as time from training increases and to investigate the effects of subsequent training on performance. Four groups of 45 soldiers were selected from the 1st Cavalry and 2d Armored Divisions at Fort Hood, Texas. A control group received no training but was tested at 3-week intervals throughout the study period.

Analysis of the test data leads to the following conclusions: (1) The greatest decay in recognition and identification performance after CVI training occurs within the 3-week period immediately following the training. Thereafter decay appears minimal or nonexistent for up to 9 weeks. The research did not deal with retention beyond 9 weeks.
(Continued)

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS	Unclassified

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
Otto H. Heuckeroth	(817) 288-1316	PERI-SH

DD Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE
UNCLASSIFIED

ARI Research Note 88-103

18. SUBJECT TERMS (Continued)

Relearning
Recall
Retraining

19. ABSTRACT (Continued)

(2) Different soldiers require differing amounts of CVI training to attain specific levels of performance; once a specific level is attained, however, performance generally decays at the same rate for all. (3) Significant performance improvement occurs after initial training, after a second repetition of this training 3 weeks later, and also when the second repetition is given 6 weeks after initial training. (4) Combat vehicle identification performance levels obtained as a result of CVI training are correlated with General Technical (GT) score.

TARGET ACQUISITION AND ANALYSIS TRAINING SYSTEM (TAATS): RETENTION AND EFFECTS OF RETRAINING

CONTENTS

LIST OF TABLES

LIST OF FIGURES

TARGET ACQUISITION AND ANALYSIS TRAINING SYSTEM (TAATS): RETENTION AND EFFECTS OF RETRAINING

INTRODUCTION

Background

Since World War II, considerable interest has been shown in the problems of target acquisition, i.e., the detection, recognition, and identification[1] of a target sufficiently well to permit the effective employment of weapons. Although great technological advances continue to be made, the human eye, when augmented, still provides the best way to recognize and identify targets. The need for recognition and identification (R&I) programs derives from the diversity of vehicles expected on the modern day battlefield. Among the many vehicles used by our allies, some look different from ours and in some cases closely resemble those of nations we consider to be potential threats. Training which improves the soldiers' R&I ability will help minimize friendly kills and maximize threat kills.

The demands on human performance in this area of recognition and identification have been increasing in the past several years. It has been generally accepted that the threat armored forces likely to be engaged by U.S. and other NATO units in a mid-to-high intensity conflict in Europe will be equipped with antitank missile systems that are both accurate and lethal at ranges extending beyond 3000 meters. This concern is made even more acute by the expectation that the threat-to-friend force ratio will be quite large (6:1). This general analysis led to increased awareness by the 6th Cavalry Brigade (Air Combat) as well as the Armor School, Fort Knox and the US Army Intelligence Center and School, Fort Huachuca, that as weapon systems change, target acquisition performance (recognition and identification) must be improved. It was in this context that FORSCOM's Opposing Force Training Detachment, Red Thrust, in 1979 and 1980 found that in both the active Army and Reserve Components no standard recognition and identification training program existed. In response to these concerns, the US Army Research Institute for Behavioral and Social Sciences, Fort Hood Field Unit, with the support of the Human Resources Research Organization, Fort Hood (ARI/HumRRO), undertook a research program to investigate systematically the problem of recognition and identification, particularly at extended ranges. The relevant literature leading to the development and evaluation of the Basic CVI program is reviewed in some detail by Smith, Heuckeroth, Warnick and Essig (1980).

Purpose and Scope of This Research Report

Results of the research effort by Smith et al. (1980) indicate that R&I performance generally improves significantly following Combat Vehicle Identification (CVI) training. In addition, results of that study indicated a noticeable performance decrement between training on five individual modules and a

---

[1] Detection is being able to state that a vehicle has come into the field of view, Recognition is being able to state whether the vehicle is "friendly" or "threat" and Identification is being able to label a vehicle by its common or accepted name, or its correct model number.

final module test administered within two days after training was completed.[2] Based on these findings, it was of practical interest to address three additional questions: (1) How rapidly do acquired R&I skills decay when not being used? (2) Do R&I skills decay differentially for soldiers differing in background factors? and (3) What is the effect of retraining which follows the original training at some later time (distributed training)? The present research addresses these questions for soldiers, generally, as well as for those differing in the background factors of GT score, rank, MOS, and use (or non-use) of glasses.

---

[2]Five training modules and a test module used in this research represent a prototype version of the Basic CVI Program. Vehicles included in each module of the prototype version are indicated in Appendix D of the Smith et al (1980) report. Other characteristics of this prototype version are identical to the Basic CVI Program (GTA 17-2-9).

METHOD

Research Method

Subjects - Soldiers selected for participation in this research effort were requested through FORSCOM to III Corps. To complete this research effort a total of 180 male soldiers from combat arms units (1st Cavalry and 2d Armor Divisions located at Fort Hood, Texas) were provided; 60 with GT below 89, 60 with GT between 90 and 109 inclusive, and 60 with GT 110 or above. It was further stipulated in this request that because continued participation of these soldiers was required at three to six week intervals over a 13 week period that none of the soldiers provided could be subject to transfer or discharge or be assigned to schools during this period.

Procedure - Four groups of 45 soldiers each were tasked to participate in this research effort. In order to simplify the data collection effort, soldiers provided by the 1st Cavalry Division were assigned to Groups 1 and 2; soldiers for groups 3 and 4 were assigned from the 2d Armored Division. Figure 1 shows the data collection plan. In Figure 1 "Training" refers to training soldiers received with the Basic CVI Program.[3]

It should be clear from review of Figure 1 that this research effort involved a longitudinal data collection effort. In order to provide a data base which would satisfy our research objectives, it was necessary that a sufficient number of soldiers actually participate in each scheduled training and testing session. Results of earlier research efforts indicated the difficulty of having soldiers return even when a single series of training/test sessions was required. This effort placed an even greater emphasis on soldiers' continued participation. To increase the liklihood that this need would be met, the battalion commander and his S3 from the 12 units providing troops for the study were given a desk-side briefing which outlined the value of the research to his unit and the Army. In addition a military research coordinator from each of the divisions established points of contact (POC) in each company and personally observed each training session so that he could call the POCs if their soldiers did not appear.

In spite of these additional efforts it became clear even after the first week of training and testing that the sample would suffer through attrition as the study progressed. In order to determine which planned analyses addressing the research objectives could be performed, it was necessary at the conclusion of the data collection effort to determine what data existed. Soldiers planned

---

[3]Training in the Basic CVI Program is divided into six training modules of five vehicles each, followed by a Final Test module. Each training module includes presentation of three images (a front, oblique and side view) of each of five vehicles, twice, accompanied by a spoken description of distinguishing vehicle characteristics. The Final Test module is composed of a front and an oblique view of each of the 30 vehicles trained in the program. A detailed description of the Basic CVI Program is found in GTA 17-2-9. During this research, soldiers were trained on two modules per day for each of three consecutive days.

WEEK	1			4			7			10			13
GROUP	7 Jun	8-10 Jun	11 Jun	28 Jun	29 Jun 1 Jul	2 Jul	19 Jul	20-22 Jul	23 Jul	9 Aug	10-12 Aug	13 Aug	30 Aug
1	MOD 7 Test	Train	MOD 7 Test	MOD 7 Test			MOD 7 Test			MOD 7 Test			
2	MOD 7 Test	Train	MOD 7 Test	MOD 7 Test	Train	MOD 7 Test	MOD 7 Test			MOD 7 Test			
3A	MOD 7 Test	Train	MOD 7 Test	MOD 7 Test			MOD 7 Test	Train	MOD 7 Test	MOD 7 Test			MOD 7 Test
3B	MOD 7 Test	Train	MOD 7 Test	MOD 7 Test						MOD 7 Test	Train	MOD 7 Test	
4	MOD 7 Test			MOD 7 Test			MOD 7 Test			MOD 7 Test			

Figure 1. Data collection plan

as part of groups 2, 3A or 3B who failed to attend any of their scheduled second period training modules were reassigned to either Group 1 or 4. Soldiers originally assigned to Groups 1, 2, 3A or 3B who attended only the 7 June pre test were reassigned to Group 4. Because attrition was expected, reassignment was viewed as a way to obtain sample sizes which would tend to increase the reliability of any findings reported.

In order to evaluate retention performance after a single training session, two treatment samples were defined. One sample (n = 14) was composed of soldiers from Group 1 who completed training on all six Basic CVI modules and who returned to be tested with module 7 posttest on 11 June, 28 June, 19 July and 9 August (See Figure 1). Since this sample was relatively small a second sample (n = 48) composed of soldiers from Group 1 and Group 3A was defined. In order to be selected for this sample, the soldier had to have completed training on all six CVI modules and returned to be tested with the module 7 test on 11 June, 28 June and 19 July (See Figure 1). Data for Group 3A after 19 July were not pertinent to this analysis.

In order to evaluate retention performance after two training sessions, a treatment sample composed of soldiers from Group 2 and Group 3A was defined (n= 13). To be included in this sample all soldiers had to have completed training on all six Basic CVI modules twice and: a) soldiers from Group 2 had to have returned for testing with Module 7 on 2 July, 19 July and 9 August (See Figure 1); b) soldiers from Group 3A had to have returned for testing with Module 7 on 23 July, 9 August and 30 August (See Figure 1). All other earlier posttraining test data that may have been available for these soldiers were not pertinent to this analysis.

In order to evaluate the effects of retraining, another treatment sample composed of soldiers from Group 2 and Group 3A was defined (n = 19). To be included in this sample all soldiers had to have completed training on all six Basic CVI modules twice and: a) soldiers from Group 2 had to have been present for Module 7 testing on 7 June, 11 June, 28 June and 2 July; b) soldiers from Group 3A had to have been present for Module 7 testing on 7 June, 11 June, 19 July and 23 July (See Figure 1). All other Module 7 test data that may have been available for these soldiers were not pertinent to this analysis.

Data Collection Instruments - During training and testing, soldiers were required to make written responses each time a vehicle image was projected. They had first to make a recognition response--name the vehicle as a friend (F), threat (T), or "Don't Know" (DK or ?)--and then attempt to identify the vehicle by name (or number) or indicate "Don't Know (DK or ?) on prepared answer sheets. (See Appendix A for examples of training and test worksheets.)

Data Analysis - Soldiers responses to the Module 7 tests provided the basis for defining a set of dependent variables for data analysis. Among the measures were:

1) Number of Slides Correctly Recognized (Front and Oblique Views)
2) Number of Slides Correctly Identified (Front and Oblique Views)

3) Number of Vehicles Correctly Recognized (Front or Oblique Views)
4) Number of Vehicles Correctly Identified (Front or Oblique Views)

The first two measures are defined as the number of 60 slides in Module 7 to which a correct response was made; the latter two measures are the number of times at least one of the two slides for each vehicles (front and oblique view) yielded a correct response. It is well understood that these measures are correlated--indeed we would be surprised were this not the case. Use of correlated measures in separate analyses has been motivated by questions raised by the R&I community.[4]

Since the research described herein was conducted as applied research, it was appropriate that the analytic approach selected should lead, primarily, to implementable findings. Accordingly, most of the analyses included in this report utilize within and mixed design analyses of variance (ANOVA)[5],[6] and the Duncan Multiple Range Test. In each case, those analyses are supported by means and standard deviations. While a more powerful multiple regression approach to ANOVA (as discussed by Cohen, 1968) might have been used to explore the relationship between different combinations of background factors (GT score, rank, MOS and use/non-use of glasses) and changes in retention over time, for the limited data available, the importance of these variables was more easily assessed with the simpler within and mixed design ANOVAs used.

---

[4]Neither type of measure seems inherently superior although "Number of Vehicles" type measures have conceptually greater meaning to some members of the R&I community. Measures based on number of slides provide more sensitive measures of program effectiveness and permit comparisons of present findings with results presented in earlier reports.

[5]ANOVAs were performed using the "BMDP-79 - Biomedical Computer Programs p-Series," Program P2V, published by the University of California Press, 1979.

[6]It is recognized that in several instances questions as to the appropriateness of using ANOVA may arise. Cell disproportionality and marked heterogeneity of variance can make it prudent to be cautious in the interpretation of some significance tests. Even where such deviations from the ANOVA model assumptions occur, the approach has been to formulate the hypotheses, perform the significance tests with these designs and interpret the findings in light of conformity with hypotheses formulated and the consistency of the findings with data reported by other investigators. As such, the philosophical approach has been to use statistical tests only as tools to assist in evaluating expectations. To the extent these tools replicate findings reported elsewhere, the inferences drawn take on a greater measure of validity. According to this approach, replicability of a finding is the ultimate test of its validity. When a finding reported is based on a statistical test where severe violations of the model assumptions have occurred and no supporting data has been reported elsewhere, a conservative approach is to present the findings as tentative conclusions requiring independent replication prior to acting as if the findings are factual. Throughout this report there has been a conscious attempt to be sensitive to this general problem.

RESULTS

Results presented in this report are designed to address three major questions: (1) Retention performance--overall, how does R & I performance change as the time elapsed since training increases?; (2) Does R&I performance change in a different way for soldiers varying in background factors?, and (3) What are the effects of retraining?

Retention Performance

The major question addressed in this section is how performance changes with elapsed time since training was completed. Analyses performed to address this question were of three primary types: (1) How does performance change as time since the original training increases? (2) How does performance change as time since the second training period was completed? and (3) How do changes in performance over time after the original training period compare with the changes which occur after a second training period? A set of secondary analyses was also performanced to address questions about changes in performance over time after the original training for soldiers differing in GT, rank, MOS, and use/non-use of glasses.

Changes in Performance after Original Training

Test Period - Table 1 below summarizes results of analyses which address performance change as a function of time elapsed since the original training was completed. That table presents results for one sample (n = 48) over three test periods after training was completed (Sample 1) and a smaller sample (n = 14) for four test periods after training was completed (Sample 2).

Results presented in Table 1 are generally consistent for analyses based on each sample. Performance is greatest for testing immediately following completion of the original training session and except for the Number of Vehicles recognized dependent measure, performance in the next test period (three weeks later) shows a significant drop; even for the latter dependent measure, the pattern of change parallels findings for other dependent measures. In most cases, performance beyond the third week after training shows an apparent improvement over the three week test period performance. In order to further evaluate these mean differences, Duncan Multiple Range Tests were performed. The test performed for the Number of Slides Recognized scores (Sample 1 only) indicated that performance immediately after training is significantly larger than during the test period three weeks later ($p < .05$); neither the differences between the last two test periods nor between the first and third test period differed significantly ($p > .05$). For Number of Slides Identified, performance (Sample 1) in all three test periods differ significantly from one another ($p < .05$). For Sample 2, only Number of Slides Identified performance immediately after training was completed differed significantly from performance in all other test periods ($p < .05$). Using the Number of Vehicles Identified, results for both samples are identical--performance immediately after training is significantly greater than during any other test periods ($p < .05$); no performance differences between any of the later test periods exist ($p > .05$).

Table 1

Changes in Performance as a Function of Time Elapsed After a Single Training Period was Completed

Dependent Measure	Sample Used[1]	ANOVA Results		Module 7 Test Dates Period 1[2] 11 Jun	Period 2 28 Jun	Period 3 19 Jul	Period 4 9 Aug
Number of Slides Recognized[3]	1 n=48	F(2,94)=4.38 p<.02	M	40.08	35.94	37.92	-
			SD	10.68	12.78	10.50	-
	2 n=14	F(3,39)=1.13 p>.05	M	45.00	40.26	39.78	40.14
			SD	5.52	12.78	7.86	11.94
Number of Slides Identified[3]	1 n=48	F(2,94)=27.67 p<.001	M	9.60	5.40	6.90	-
			SD	8.46	5.88	6.00	-
	2 n=14	F(3,39)=4.82 p<.01	M	11.70	7.08	8.10	8.64
			SD	10.02	6.90	6.48	6.30
Number of Vehicles Recognized[4]	1 n=48	F(2,94)=2.86 p>.05	M	25.00	23.12	24.15	-
			SD	5.62	7.20	5.57	-
	2 n=14	F(3,39)<1 p>.05	M	27.07	24.43	24.86	24.50
			SD	2.09	7.26	3.66	6.78
Number of Vehicles Identified[4]	1 n=48	F(2,94)=27.46 p<.001	M	7.17	4.17	5.40	-
			SD	5.80	4.32	4.45	-
	2 n=14	F(3,39)=6.37 p<.01	M	8.57	5.07	6.29	6.43
			SD	6.58	4.81	4.86	4.48

[1]Samples are defined in the METHOD Section.

[2]Period 1 test was first Module 7 test given one day after completing the original training period. No additional CVI training was provided before subsequent test periods.

[3]For each soldier there were 2 presentations of each of 30 different vehicles for the total of 60 slide presentations on each Module 7 Test Date.

[4]For each soldier there were 30 different vehicles presented. Maximum possible score of 30. Credit for a vehicle was recorded if a correct response was reported for either (or both) slides presented for each vehicle.

Test Period and Vehicle. In order to determine whether performance degrades selectively for different vehicles, analyses of variance were conducted for recognition and identification scores. Since the pattern of performance over test periods using Samples 1 and 2 was essentially the same in most cases, all subsequent analyses were based on the larger sample--Sample 1. Means and standard deviations showing changes in recognition and identification performance of each vehicle over three test periods are shown in Table 2.

Results of analysis of these differences indicated no differential change in recognition performance for different vehicles over time [$F(58,2726) = 1.17$, $p > .05$]; vehicle identification performance, however, does show differential performance changes over test periods following the original training [$F(58,2726) = 1.80$, $p < .001$]. Review of Table 2 reveals two basic findings: 1) Between the 11 June and 28 June testing, performance for most vehicles declines; and 2) for at least two-thirds of the vehicles, performance on 19 July shows some improvement or stays the same as 28 June performance.

Since no CVI training was provided for these soldiers between test periods, the significant improvement in Number of Slides Identified performance between the second and third test period deserves further mention. The pattern of change suggests that between 28 June and 19 July soldiers were involved in activities which affected R&I knowledges. During July of each year the 49th Armored Division, Texas National Guard comes to Fort Hood for training exercises. This training makes use of several of the armored vehicles included in the CVI program--specifically the M113, M109 and M48. The considerable exposure to these vehicles by 1st Cav and 2AD troops which support this training could well have supplemented many of these soldiers' R&I knowledges. Review of Table 2 indicates that the performance improvement on these vehicles from the 28 June to 19 July test periods was relatively large. When this analysis was repeated eliminating those vehicles (as well as the M60 and M1 also present at Fort Hood), changes in Number of Slides Identified performance between these two later test periods are no longer significant ($p > .05$).

Examining retention performance on different vehicles is important to both the trainer and program developer. For the trainer, above average performance loss indicates those vehicles requiring special training emphasis; for the developer, such performance provides a rationale for development of special remedial training modules. In order to address this concern, performance data for each vehicle on 11 and 28 June presented in Table 2 were used. For each vehicle, recognition and identification performance differences were independently summed and divided by 30 to yield an average difference--one for recognition, one for identification. Vehicles showing above and below average performance differences on both measures were tabled (See Table 3). Vehicles for which the loss is notably high or low (.1 from the mean difference) are highlighted (*). Identical analyses were performed for data reported by Smith et al. (1980). Vehicles in that research showing the same pattern of differences are underlined in Table 3.

Table 2

Means and Standard Deviations of Number of Slides Recognized and Identified for Each Vehicle Over Three Test Periods Following a Single Training Period[1]

	RECOGNITION						IDENTIFICATION					
	Period 1 11 Jun		Period 2 28 Jun		Period 3 19 Jul		Period 1 11 Jun		Period 2 28 Jun		Period 2 19 Jul	
Vehicles[3]	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
T62	1.33	.72	1.35	.73	1.33	.75	.44	.62	.27	.49	.38	.53
BTR60P	1.38	.67	1.29	.71	1.19	.67	.04	.20	.00	.00	.02	.14
LEO	1.46	.62	1.33	.75	1.48	.68	.10	.31	.10	.31	.19	.39
M113	1.75	.60	1.42	.82	1.50	.68	.92	.85	.62	.79	.81	.84
SCORP	1.33	.81	1.31	.83	1.33	.78	.29	.54	.21	.50	.31	.66
BMD	1.62	.61	1.44	.74	1.56	.62	.06	.24	.00	.00	.06	.24
M60A1	.98	.56	.85	.62	1.04	.54	.38	.49	.29	.46	.35	.48
ASU85	1.15	.77	1.04	.80	1.10	.75	.12	.39	.04	.20	.04	.20
AMX13	1.46	.71	1.15	.77	1.25	.76	.27	.64	.19	.53	.27	.57
M109	1.62	.53	1.54	.68	1.71	.58	1.21	.85	.81	.84	1.04	.92
M48	.83	.83	.90	.78	.96	.85	.25	.53	.06	.32	.27	.49
SALA	1.15	.74	1.12	.84	1.17	.81	.44	.71	.10	.37	.21	.50
ZSU234	1.50	.71	1.33	.81	1.31	.80	.29	.58	.15	.46	.17	.48
BTR50	1.50	.68	1.29	.77	1.12	.73	.10	.37	.04	.20	.02	.14
XM1	1.60	.64	1.31	.78	1.56	.71	.83	.78	.48	.65	.62	.64
PT76	1.58	.68	1.33	.78	1.50	.74	.15	.41	.12	.44	.10	.42
SCIM	1.52	.68	1.42	.77	1.29	.77	.35	.67	.10	.42	.08	.28
MARDER	1.35	.76	1.19	.70	1.27	.71	.40	.71	.25	.53	.17	.48
T72	1.06	.78	.77	.75	.85	.77	.21	.50	.06	.24	.19	.49
AMX30	.98	.79	.96	.74	.90	.78	.23	.56	.17	.48	.15	.41
ZSU572	1.44	.68	1.33	.83	1.10	.83	.17	.48	.10	.42	.10	.42
JAGD	.85	.80	.92	.87	.85	.85	.25	.64	.19	.57	.27	.61
T54/55	1.33	.69	1.15	.77	1.46	.68	.17	.38	.17	.43	.17	.43
ROLAND	.96	.82	.90	.75	1.12	.82	.21	.54	.10	.42	.04	.20
CHIEF	1.52	.65	1.31	.78	1.50	.68	.27	.54	.12	.33	.19	.39
BRDM	1.42	.71	1.29	.74	1.38	.73	.33	.67	.06	.24	.10	.31
CEN	1.54	.65	1.21	.80	1.42	.71	.38	.61	.12	.44	.12	.39
BMP	1.46	.74	1.52	.74	1.44	.71	.12	.33	.06	.24	.12	.33
SP74	1.25	.79	1.08	.74	1.12	.76	.38	.67	.29	.58	.21	.58
GEP	1.17	.81	.90	.72	1.06	.78	.21	.54	.08	.35	.10	.37

[1] n = 48
[2] See Footnote 2, Table 1
[3] For each soldier there were 2 slide presentions on each vehicle on each Module 7 Test Date--maximum score is 2.

Table 3

Vehicles Whose Performance Differences Between 11 June (Module 7) Posttest and 28 June (Module 7) Posttest Are Greater or Less than Mean Performance Differences (for All Vehicles)[1]

		Identification (Mean Performance Difference = ±.070)			
		Below Mean		Above Mean	
Recognition (Mean Performance Difference = ±.069)	Below Mean	BTR60 LEO* *SCORP M60 ASU85	*AMX30 ZSU572 *JAGD ROLAND *BMP	*T62 *M109* *M48 *SALA* SCIM*	BRDM*
	Above Mean	BMD *AMX13 BTR50 *PT76* T54/55*	SP74 *GEP	*M113 ZSU234 *M1* MARDER *T72	CHIEF *CEN*

[1] * To the left of a tabled vehicle name means that the recognition performance difference is at least .1 from the mean performance difference; * to the right has comparable meaning for identification performance.

Vehicles where performance loss is greater than average provides evidence which is consistent with the recommendation that added training (or retraining) emphasis is warranted. Taken together the findings from analysis of the Smith et al. (1980) data and the current research point to the importance of added training/retraining on the ZSU234, MARDER, CHIEF and CEN and the relatively lesser importance of such training on the LEO, M60, ZSU572 and JAGD. It needs to be emphasized that especially because identification performance is uniformly low on most vehicles, these conclusions are based on relative comparisons. Once the Army has formulated R&I criterion performance levels, those requirements should drive the training/retraining need. Viewed in this context, the above conclusions could reasonably be used as a basis for some modification of the training materials--even if during the training only a statement to highlight their difficulty is added.

Test Period and Angle - The pattern of performance change over test periods generally did not differ significantly between vehicles presented in the front view and vehicles presented in the oblique view. For slides recognized [F (2,94) = 2.33, $p > .05$]; for slides identified [F (2,94) = 1.31, $p > .05$].

Test Period and Background Factors - In order to determine whether retention performance varies as a function of background factors, several analyses of variance were performed. Results of those analyses together with mean performance differences for each background variable over three test periods are presented in Tables 4 and 5.

In these analyses, an attempt was made to define categories of each background factor so that results reported here would be comparable to findings reported in previous studies. Categories of MOS were defined by placing soldiers having like MOS's into Combat Arms groups corresponding to MOS type. Categories chosen for Rank were selected so as to arrive at sample sizes which would increase the reliability of performance measures reported.

A review of mean recognition performance for different background categories in Table 4 indicates no significant relationships were found using recognition performance for any differences in GT score, rank, MOS or use/non use of glasses. Table 5 indicates that identification performance increases significantly as a function of GT score. Further, there is a tendency for identification performance to increase with rank and to be superior for soldiers holding an Armor MOS. As with recognition performance, the data indicate no meaningful relationship based upon the soldiers' use or nonuse of glasses. Findings in these tables also indicate that generally neither recognition nor identification performance changes in a different manner over test periods for different categories of the background variables[7].

---

[7]Examining means for changes in identification performance of MOS groups over test periods indicates that this relationship is largely a consequence of the markedly greater drop between the first and second test period by Armor soldiers than for those with Artillery or Infantry MOS. Neither the meaning nor importance of this difference are clear.

Table 4

Results From Analyses of Recognition Performance for Selected Background Factors (BF) Over Three Test Periods (11 June, 28 June, 19 July) Following a Single Training Period[1]

Background Factors (BF)

SV	STAT	GT			RANK				MOS			GLASSES	
BF[2]													
	F	F(2,45)=2.48, p>.05			F(3,44)=2.49, p>.05				F(2,39)=1.98, p>.05			F(1,43)<1, p>.05	
	n	15	13	20	12	17	15	4	10	17	15	11	34
		<89	90-109	110+	E1E2	E3	E4	E5E8	Inf	Artil	Armor	Yes	No
	M	34.32	36.90	41.46	33.60	38.46	42.48	32.34	39.24	34.98	42.00	40.32	37.38
	SD	10.26	11.88	7.14	11.28	6.78	6.78	19.50	6.42	9.60	12.36	6.30	11.04
BF x Period	F	F(4,90)<1, p>.05			F(6,88)<1, p>.05				F(4,78)<1, p>.05			F(2,86)=2.37, p>.05	
BF x Period x Vehicle	F	F(116,2610)<1, p>.05			F(174,2552)<1, p>.05				F(116,2262)=1.05, p>.05			F(58,2494)<1, p>.05	
BF x Period x View	F	F(4,90)<1, p>.05			F(6,88)=1.14, p>.05				F(4,78)=2.03, p>.05			F(2,86)=1.69, p>.05	

[1]For each soldier there were two presentations of each of 30 different vehicles for the total of 60 slide presentations on each Module 7 Test Date. Row M indicates the average number of slides correctly recognized by the particular GT, rank, etc. group.

[2]Background Factor. For reading entries in any column, substitute in Column 1 for "BF" the particular Background Factor shown at the top of the column of interest.

Table 5

Results From Analysis of Identification Performance for Selected Background Factors (BF) Over Three Test Periods (11 June, 23 June, 19 July) Following a Single Training Period[1]

		Background Factors (BF)												
SV	STAT	GT			RANK				MOS			GLASSES		
BF[2]	F	F(2,45)=6.71, p<.01			F(3,44)=1.59, p>.05				F(2,39)=2.84, p>.05			F(1,43)=1.86, p>.05		
	n	15	13	20	12	17	15	4	10	17	15	11	34	
		<89	90-109	110+	E1E2	E3	E4	E5E8	Inf	Artil	Armor	Yes	No	
	M	4.14	5.46	10.86	3.84	8.34	8.58	8.52	6.12	6.48	11.16	5.04	8.04	
	SD	2.82	5.28	7.50	2.82	7.80	6.54	6.30	6.36	3.48	8.40	4.50	6.84	
BF x Period	F	F(4,90)=1.72, p>.05			F(6,88)=1.28, p>.05				F(4,78)=3.51, p=.01			F(2,56)=1.67, p>.05		
BF x Period x Vehicle	F	F(116,2610)<1, p>.05			F(174,2552)<1, p>.05				F(116,2262)=1.18, p>.05			F(58,2494)<1, p>.05		
BF x Period x View	F	F(4,90)<1, p>.05			F(6,88)<1, p>.05				F(2,78)<1, p>.05			F(2,86)<1, p>.05		

[1]For each soldier there were two presentations of each of 30 different vehicles for the total of 60 slide presentations on each Module 7 Test Date. Row M indicates the average number of slides correctly identified by the particular GT, rank, etc. group.

[2]Background Factor. For reading entries in any column, substitute in Column 1 for "BF" the particular Background Factor shown at the top of the column of interest.

Performance Change After Two Complete Training Periods

From review of the Data Collection Plan (Figure 1), it is noted that only soldiers in Groups 2 and 3A could receive two complete training periods (training on Modules 1-6) and a total of three Module 7 posttraining tests after completion of the second training period. As noted earlier (see Method procedure), soldiers who actually satisfied these conditions were selected as the treatment sample. Each of the dependent variables for this sample were cast into a mixed design analysis of variance where the portion of the treatment sample from each Group were levels of a between subjects variable and test period was the within subjects variable. Had sample sizes of each Group been somewhat larger and greater comparability on several background factors existed, Groups could have defined a variable named "Time Between Training Periods." However, because these conditions could not be satisfied with the limited data available, incorporation of Groups as a variable in the design is best viewed simply as a way to partition out variability from the error term. This procedure creates a more powerful statistical test of performance changes across test periods. Means and standard deviations supporting statistical tests are found in Table 6.

Table 6

Changes in Performance as a Function of Time Elapsed After a Second Training Period Was Completed (n=13)

Dependent Measure	ANOVA Results		Module 7 Test Periods[1] Test Period 1	Test Period 2	Test Period 3
Slides Recognized[2] (Total)	$F(2,22)=1.48$, $p > .05$	M	44.46	41.16	43.02
		SD	10.62	14.40	10.92
Slides Identified[2] (Total)	$F(2,22)=17.59$, $p < .001$	M	15.36	10.26	10.02
		SD	12.66	8.46	8.58
No. Vehicles Recognized[3]	$F(2,22)<1$, $p > .05$	M	26.54	25.38	25.77
		SD	3.76	7.10	3.32
No. Vehicles Identified[3]	$F(2,22)=20.28$, $p < .001$	M	10.31	7.46	6.92
		SD	7.65	5.78	5.41

[1] For all soldiers used, test period 1 occurred the day following completion of the second training period; later test periods are separated by approximately three week intervals with no intervening CVI training.
[2] See footnote 3, Table 1.
[3] See footnote 4, Table 1.

Test Period - Neither Number of Slides Recognized nor Number of Vehicles Recognized dependent measures showed significant changes over test periods ($p > .05$); however, both Number of Slides Identified and Number of Vehicles Identified dependent measures show significant performance decay ($p < .001$). Duncan Multiple Range Tests indicated that only the performance decrement noted between the first and latter two test periods were significant ($p < .05$); differences between second and third test periods were not significant ($p > .05$). Means and standard deviations together with overall statistical analyses supporting these conclusions are presented in Table 6.

Comparison of Performance Change After One versus Two Complete Training Periods

Regardless of whether the first or second training period is considered, performance is greatest on the first test immediately following the training period and declines to a point where it remains relatively stable from three to six weeks later (Data supporting these conclusions are found in Tables 1 and 6). While the findings appear similar in both tables, the comparability of the sample used is unknown. In order to better assess the differences in performance change after one versus two training periods, a special set of analyses was planned. To better assure that performance following one and two training sessions could be compared independently of sample characteristics, matched samples for the two major treatment conditions were created. Characteristics selected for matching included GT, rank, MOS and use/non-use of glasses on the job. Performance of the 13 soldiers included in Group 2 and Group 3A for the three test periods following the second training session defined one of the major treatment groups. The background characteristics of these 13 soldiers were used to select another 13 soldiers (matched on those characteristics) from the 48 soldiers who were Sample 1 (See Table 1). Performance of these latter 13 soldiers for the three periods following their first training session constituted the other treatment group. Results of analyses performed were generally consistent in showing that regardless whether one or two training periods were received, patterns of decay from a time after training to three and six weeks later shows no significant difference--for Slides Recognized, $F(2,48) = 1.29$, $p > .05$, for Slides Identified, $F(2,48) = 1.04$, $p > .05$, for Number of Vehicles Recognized, $F(2,48) < 1$, $p > .05$, or Number of Vehicles Identified, $F(2,48) = 1.37$, $p > .05$. These findings imply that performance decay after one training session follows the same pattern as for soldiers who have received two training sessions--when the interval between training periods is 3 to 6 weeks apart.

Effects of Retraining (Recovery)

From review of the Data Collection Plan (Figure 1), it is noted that only soldiers in Groups 2, 3A and 3B were scheduled to receive two training periods during the study. In order for a soldier to be considered for inclusion in analyses to assess differences in the effects of training and retraining, all training modules in both scheduled periods had to have been completed in addition to module 7 tests which immediately preceded and followed each training period. Group 3B was not included in the analyses as the number of cases available was exceedingly small ($n = 4$) and the time between training periods

quite lengthy. To the extent lengthy time between training sessions is important and the small sample size contributes to unreliability in the data, inclusion of other data would probably have increased variability in the data analyzed--a condition which would have contributed to a less efficient statistical test of the effects of retraining. Training periods for the two remaining samples (Groups 2 and 3A) were 3 and 6 weeks apart, respectively. For these groups module 7 tests were available on dates shown in Table 7.

Table 7

Dates Module 7 Tests Had to be Available for Treatment Groups[1]

	Period 1	Period 2	Period 3	Period 4
Group 2 (n=7)	7 June	11 June	28 June	2 July
Group 3A (n=12)	7 June	11 June	19 July	23 July

[1] All soldiers completed training on all six modules of the Basic CVI program between periods 1 and 2, and between periods 3 and 4, respectively.

Since the major question addressed was the significance of changes in performance between pretraining and posttraining test for each training session, all analyses made use of difference scores--period 2 minus period 1 and period 4 minus period 3--Slides Recognized (Total) and Slides Identified (Total) as well as Number of Vehicles correctly Recognized and Identified. Each of these scores was cast into a mixed design ANOVA where the portion of the treatment sample from each group were levels of the between subjects variable and each test period difference was the within subjects variable. Since soldiers comprising Groups 2 and 3A came from different divisions as well as having different lengths of time between training sessions--a condition characterized in statistics as confounding--the between subjects variable (Groups) was included in the design only to partition variability from the error term, and thereby create a more efficient statistical test of the differences in effectiveness of each training period on R&I performance.

Test Period - To assess the importance of repeated training, it was of interest to determine the relative importance of successive training periods on performance change. Means and standard deviations together with results of statistical analyses are summarized in Table 8. From review of this table, it is noted that regardless of what dependent measure was used, performance improved significantly between each pretraining and posttraining test (See columns 2 and 3, Table 8); however, only the recognition measures showed significant differences in the amount of pretraining to posttraining test change surrounding each training period (See column 1, Table 8). Generally, the amount

of performance recognition improvement is greater following the first training period; for identification measures, the improvement from each pretraining to posttraining test is about equal. It is encouraging to note here that successive training sessions will lead to significant improvements in performance--not simply recovery in performance lost through decay, but an improvement beyond that attained by the end of the first training session.

Table 8

Results From Analysis of Changes in Performance From Pretraining to Posttraining Test Surrounding Each Training Period (n=19)

Dependent Measures	Differences in Pretraining to Posttraining Tests Changes[1]		First Training Period Pretraining Tests	Posttraining Tests	Second Training Period Pretraining Tests	Posttraining Tests
Slides Recognized[2] (Total)	$F(1,17)=5.37, p<.05$	M	28.56	39.84	38.76	42.78
		SD	14.04	6.72	7.08	9.72
			$F(1,18)=15.82, p<.001$		$F(1,18)=6.94, p<.025$	
Slides Identified[2] (Total)	$F(1,17)<1, p>.05$	M	1.08	7.26	5.10	12.06
		SD	2.04	6.96	5.10	11.64
			$F(1,18)=23.99, p<.001$		$F(1,18)=17.14, p<.001$	
No. Vehicles Recognized[3]	$F(1,17)=5.74, p<.05$	M	19.42	25.74	24.42	26.16
		SD	8.58	2.23	2.65	3.55
			$F(1,18)=13.37, p<.01$		$F(1,18)=6.01, p<.025$	
No. Vehicles Identified[3]	$F(1,17)=1.13, p>.05$	M	1.00	5.58	4.00	8.32
		SD	1.86	5.08	3.68	7.23
			$F(1,18)=31.36, p<.001$		$F(1,18)=20.28, p<.001$	

[1]Analyses of differences in pretraining test to posttraining test changes were based on calculation of performance difference scores for each soldier.
[2]See footnote 3, Table 1.
[3]See footnote 4, Table 1.

DISCUSSION

Background and Method

Four groups of 45 soldiers each were selected from the 1st Cavalry and 2d AD at Fort Hood, Texas, to participate in a research effort designed: 1) to assess retention of combat vehicle recognition and identification performance skills as a function of time elapsed since training; and 2) to determine the effects of retraining. A control group was never trained but was tested at three week intervals. All remaining groups were tested before and after each training period and tested at three week intervals thereafter. One group was trained only once; the two remaining groups were trained a second time either three or six weeks after the original training. Target recognition and identification performance was assessed by four measures: 1) Number of Slides Recognized; 2) Number of Slides Identified; 3) Number of Vehicles Recognized; 4) Number of Vehicles Identified.

Implications of Sample Attrition

As the study progressed, sample attrition resulted in some of the more detailed aspects of study objectives being deleted from consideration.

Retention Performance

Examination of performance three, six and nine weeks after an original training period indicated that the greatest decay occurs sometime within the three week period immediately following training. Thereafter, decay appears minimal (or non-existent) for up to nine weeks. Decay following a second training period shows a similar trend. Based on the results from these limited data, if performance levels reflected three weeks after training are acceptable, retraining is not recommended until at least the ninth week. The present work does not permit extrapolation beyond this time.

Results cited above may be limited by the use of a strategy where soldiers went through a fixed sequence of training and testing. Alternative strategies for training which might improve long-term retention include:

- Training soldiers until performance reaches a specified criterion. The criterion selected will depend on cost-effectiveness considerations associated with time to train to a criterion and the resulting retention curves.

- Retraining soldiers less than three weeks after original training was completed. Cost-effectiveness concerns associated with training time, meeting other training requirements and resulting retention curves must be considered.

Retention Performance and Background Factors

Among the background factors explored in this research were GT, rank, MOS, and use of glasses on the job. Results indicated that soldiers with different characteristics may attain different performance levels given a fixed amount of training. Overall identification performance levels attained were higher for soldiers who had higher GT scores. No significant relationships were found using identification performance for either rank or use/non-use of glasses. For recognition performance, no significant relationships were found between performance and GT scores, MOS, rank or use/non-use of glasses. Soldiers with an Armor MOS were somewhat superior to those holding an Infantry or Artillery MOS. A major question in this research was whether soldiers in different categories of these factors would show differential retention performance as the time since training increased. Up to six weeks after training, the answer almost uniformly was no. On the average those who performed poorly initially showed the same retention performance pattern as did those who performed well. This research indicates that some soldiers require more training to attain a specific level of performance; however, once that level is attained, performance generally will decay at about the same rate for all.

In order to formulate more meaningful R&I training which is cost-effective, the Army must: 1) establish criteria for acceptable R&I performance; 2) determine optimal training strategies to achieve performance at that level; and 3) make an assessment to determine for whom the required training would not be cost-effective (if any).

Effects of Retraining

In the analyses of the effects of retraining, two groups of soldiers were used: one group was retrained 3 weeks after the first training; a second group was retrained six weeks after the original training. In comparing pretraining and posttraining test scores, overall analyses indicated significant performance improvement occurred as a result of each training period. Further, performance at the end of the second training period was higher than at the end of original training. On the average, improvements in identification performance are about equal with each training period; recognition performance, however, improves most during the first training period.

As in the discussion of performance changes, it seems that the most important concern is to devise a training strategy which will optimize the speed of learning and maximize retention over time. With measures of performance surrounding only two training periods, formulation of a recommended training strategy is necessarily tentative. If we assume that the nearly identical pretraining to posttraining test improvements obtained in identification performance surrounding each of the two training periods (separated by at least three weeks) will be the same for subsequently equally spaced training periods, an extrapolation of these findings would permit an inference that eight or nine such training periods would be required before soldiers could correctly identify 80% of the vehicle images presented--for a total of 48.

Cost Effectiveness Considerations of Retraining

It is apparent from review of immediate posttraining test data presented herein that learning to recognize, and more especially, identify friendly and enemy vehicles is a difficult task. Further, knowledges acquired appear somewhat transient--they decay over time. Faced with such information there are at least two primary questions that should be asked. First, how important is it for soldiers to be able to recognize and identify friendly and enemy vehicles. In answering this question the focus is on materiel resources and people. If a soldier incorrectly fires on one of his own vehicles only one time, the loss of equipment (not to mention the training and other costs inherent in the loss of lives) may be in the millions; if he fails to correctly identify an enemy he and his weapon may become the casualty with a corresponding loss. Since the projected threat-to-friend force ratio is expected to be quite large (6:1) NATO units can ill afford to lose equipment or soldiers which further increases the ratio. Apart from cost of equipment loss due to inadequate R&I skills, many U.S. or allied soldiers may be killed.

Second, given the importance of R&I to preservation of life, materiel resources and ultimately the winning of battles, how can these skills (or functions) be best provided? The Combat Vehicle Identification (CVI) Training programs developed and evaluated by the Fort Hood Field Unit over the past seven years came out of a concerted effort to employ the best known methodology for developing and evaluating training programs that could be utilized today by a large portion of the American soldier force. The apparent demonstrated difficulty of acquiring and retaining these R&I skills should stimulate further research. Electronic Identification Friend/Foe (IFF) has been widely discussed in the R&I community as a means to resolve this problem. However, movement from the conceptual stage to developmental and implementation phases has been slow. The Army cannot wait for advanced technology to resolve the R&I problem. Given the need and the difficulty of acquisition and retention, more research and development in this area is clearly needed. Indeed, over the past seven years the Target Acquisition and Analysis Training System (TAATS) has sought to explore how to optimize acquisition (and retention) of R&I skills with the programs currently in the Army inventory. The current research supports the value of retraining--specifically retraining does lead to higher levels of demonstrated R&I skills. Related research also supports the efficacy of retraining on acquisition of R&I skills--most especially for about 2/3 of the soldiers trained. Research utilizing ASVAB data and the background characteristics of soldiers who have participated in the TAATS research effort is concurrently underway to determine whether the soldiers who prove most trainable can be identified prior to Army training. Since the Army has limited training time available, it is important to indicate the level of committment that training and retraining will require. Documentation describing the Basic CVI program (Smith et al. 1980) indicates training on one module takes a maximum of 50 minutes. Variation in time required is dependent largely on the number of questions or amount of discussion by soldiers in the "manual presentation phase" of the training. Research with this program indicates that for the first training session, 40 minutes per module is a good average. With six training modules then per session, the complete first training session involves about 4 actual hours of training. Army training schedules generally should provide for training/testing two modules per day.

Again, research indicates that for the second training session fewer questions and less discussion makes 30 minutes per module a good average. For subsequent training sessions this time is reduced to approximately 20 minutes per module. With these estimates then, actual training and testing time for three complete sessions of six training and a final test module is about 9 hours.

CONCLUSIONS

1. The greatest decay in recognition and identification performance after CVI training occurs within the three week period immediately following the training. Thereafter decay appears minimal or non-existent for up to nine weeks. The current research did not deal with retention beyond nine weeks.

2. Different soldiers require differing amounts of CVI training to attain specific levels of performance; however, once a specific level is attained, performance generally decays at the same rate for all.

3. Significant performance improvement occurs after initial training, and also after a second repetition of this training three weeks later, and also when the second repetition is given six weeks after initial training.

4. Combat vehicle identification performance levels obtained as a result of CVI training are correlated with GT score.

REFERENCES

Cohen, J. (1968). Multiple regression as a general data analytic system. Psychological Bulletin, 70(6), 426-443.

Shope, G. L., Smith, N. D., Heuckeroth, O. H., Warnick, W. L., & Essig, S. S. (1982). Evaluation of an advanced Combat Vehicle Identification (CVI) training program (masking): New approach to target acquisition training (Research Report 1368). U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A148 911)

Smith, N. D., Neuckeroth, O. H., Warnick, W. L., & Essig, S. S. (1980). Evaluation of a new approach to target acquisition training: The Combat Vehicle Identification (CVI) training program (Research Report 1304). U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A111 732)

Smith, N. D., Shope, G. L., Heuckeroth, O. H., Warnick, W. L., & Essig, S. S. (1985). Target acquisition and analyses training system: An evaluation of the basic Thermal (IR) Combat Vehicle Identification (TCVI) training program (Research Report 1378). U.S. Army Research Institute for the Behavioral and Social Sciences. (AD A192 488)

APPENDIX A

Privacy Act Statement and Training/Testing Worksheets

DATA REQUIRED BY THE PRIVACY ACT OF 1974
(5 U.S.C. 552a)

TITLE OF FORM	PRESCRIBING DIRECTIVE
Basic Combat Vehicle Identification (CVI) Training Program - Soldier Information	AR 70-1

1. AUTHORITY

10 USC Sec 4503

2. PRINCIPAL PURPOSE(S)

The data collected with the attached form are to be used for research purposes only.

3. ROUTINE USES

This is an experimental personnel data collection form developed by the U.S. Army Research Institute for the Behavioral and Social Sciences pursuant to its research mission as prescribed in AR 70-1. When identifier (name or Social Security Number) are requested they are to be used for administrative and statistical control purposes only. Full confidentiality of the responses will be maintained in the processing of these data.

4. MANDATORY OR VOLUNTARY DISCLOSURE AND EFFECT ON INDIVIDUAL NOT PROVIDING INFORMATION

Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interests of the research, but there will be no effect on individuals for not providing all or any part of the information. This notice may be detached from the rest of the form and retained by the individual if so desired.

FORM	Privacy Act Statement - 26 Sep 75

DA Form 4368-R, 1 May 75

Module No._____
Seat # _____

SOLDIER WORK SHEET

SOLDIER NAME_____ RANK_____

MODULES 1-6

Section A: Manual Presentation Sequence

Trial	Friend/ Threat	Vehicle Description	Trial	Friend/ Threat	Vehicle Description
1			14		
2			15		
3			16		
4			17		
5			18		
6			19		
			20		
			21		
9			22		
10			23		
11			24		
12			25		
13					

Module No._____
Seat # _____

SOLDIER WORK SHEET

SOLDIER NAME_____ RANK_____

MODULES 1-6

Section B: Automated Presentation Sequence

Trial	Friend/ Threat	Vehicle Description	Trial	Friend/ Threat	Vehicle Description
26	_____	_____	39	_____	_____
27	_____	_____	40	_____	_____
28	_____	_____	41	_____	_____
29	_____	_____	42	_____	_____
30	_____	_____	43	_____	_____
31	_____	_____	44	_____	_____
32	_____	_____	45	_____	_____
33	_____	_____	46	_____	_____
34	_____	_____	47	_____	_____
35	_____	_____	48	_____	_____
36	_____	_____	49	_____	_____
37	_____	_____	50	_____	_____
38	_____	_____			

Module No._____
Seat # _____

SOLDIER ANSWER SHEET

Soldier Name_____ Rank_____

MODULES 1-6

Section C: Module Test (Automated)

(8 second exposure)

Trial	Friend/Threat	Vehicle Description
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

DATE_____
MODULE NO._____
SEAT #_____
RANGE_____

BASIC COMBAT VEHICLE IDENTIFICATION (CVI) TRAINING PROGRAM

MODULE 7

SOLDIER INFORMATION

1. Name:_____
(Last) (First) (MI)

2. Rank:_____ 3. SSN:_____

4. Age:_____ 5. Military Unit:_____

6. Time in Service:_____ _____
(Years) (Months)

7. MOS:_____

8. Length of time in MOS: _____ _____
(Years) (Months)

9. What is the MOS of the job to which you are currently assigned?

_____

10. Do you wear glasses (or contact lenses) on the job?
Yes_____ No_____

10a. Do you wear glasses (or contact lenses) only for reading?
Yes_____ No_____

PRE-POST TEST - SOLDIER ANSWER SHEET

Slide #	Friend	Threat	Vehicle Description	Slide #	Friend	Threat	Vehicle Description
1	0	0		31	0	0	
2	0	0		32	0	0	
3	0	0		33	0	0	
4	0	0		34	0	0	
5	0	0		35	0	0	
6	0	0		36	0	0	
7	0	0		37	0	0	
8	0	0		38	0	0	
9	0	0		39	0	0	
10	0	0		40	0	0	
11	0	0		41	0	0	
12	0	0		42	0	0	
13	0	0		43	0	0	
14	0	0		44	0	0	
15	0	0		45	0	0	
16	0	0		46	0	0	
17	0	0		47	0	0	
18	0	0		48	0	0	
19	0	0		49	0	0	
20	0	0		50	0	0	
21	0	0		51	0	0	
22	0	0		52	0	0	
23	0	0		53	0	0	
24	0	0		54	0	0	
25	0	0		55	0	0	
26	0	0		56	0	0	
27	0	0		57	0	0	
28	0	0		58	0	0	
29	0	0		59	0	0	
30	0	0		60	0	0	